Chemical & Engineering NEWS

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Big-volume acids

Exports are main hope in a weak market

A Key Chemicals Review Page 18

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Chemical & Engineering NEWS

Cover: Occidental Petroleum's vessel *Frances Hammer* carries superphosphoric acid from Florida to the Soviet Union as part of a trade agreement

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Big-volume acids join the recession

One of chemical industry's few bright spots since 1979, sulfuric and phosphoric acids now are struggling because of poor fertilizer market

The party's over for one of the U.S. chemical industry's biggest and, until recently, brightest product areas, the $7 billion-per-year big-volume acid business. And even if the party starts up again later this year, it may be strictly a milk and crackers affair. The champagne days of 1979, 1980, and part of 1981 are gone for sulfuric and phosphoric acids.

What is ruining the festivities for these two mammoth inorganics is deep trouble in their dominant use, phosphate fertilizer. A true worldwide business, phosphates first weakened in the U.S. in 1980 and then lost export momentum in 1981.

Exports are important three ways—for phosphoric acid itself, phosphate fertilizer, and the grain grown using phosphates. Right now, all three are soft enough that prices are way down. Acid producers still hope for an export pickup to save them later this year, but realistically no relief is in sight—despite the large superphosphoric acid shipments by Occidental Petroleum to the Soviet Union.

Long term, the boom years of 1979 and 1980 will be exceeded eventually, but not in 1982 and possibly not in 1983. The outlook for phosphate fertilizer is very unclear for the next several years. A mass of economic and political forces is at work, giving phosphates and their precursor acids a negative outlook at the moment.

For example, the state of credit clearly influences demand for fertilizer. In the U.S., money for fertilizer is now very tight with interest rates again on the rise. Producers of the acids therefore expect little change in production rates this quarter from the low rates in late 1981. Because of the cost of money, no inventory building is expected now even though inventories are considered modest at fertilizer dealers and the peak marketing season in the spring is just around the corner.

So this spring, when acid producers expect a pickup in fertilizer demand, some sales may be lost because of a lack of inventory. That applies especially to the domestic phosphate delivery chain—the U.S. dealers who quickly supply farmers when spring weather permits. Paperwork delays generally give producers enough time to round up product for export sales. However, the sheer size of some export orders can tempt producers to divert product from domestic markets.

Key Chemicals

This year, as in early 1981, acid producers are pinning high hopes on exports of phosphoric acid and derivatives to recover from the previous year's slump. But exports depend heavily on fragile factors such as U.S. relations with the Soviet Union, debt loads in developing countries, and competition from other acid sources such as North African countries.

To date, the U.S. government has held off blocking Occidental Petroleum's sales to the Soviet Union as a sanction in the Polish crisis. The U.S. phosphoric industry assumes that no such embargo will happen.

But in international politics, such assumptions can go wrong. Two years ago at the time of the Soviets' invasion into Afghanistan, President Carter at first let Occidental's Soviet deal continue and then suspended it. It took almost a year and a half for Soviet-bound shipments to resume. In the interim, industry analysts estimate that diversion of Occidental's production added about 5% of unwanted output to the U.S. domestic market.

The U.S. market for fertilizer also hangs importantly on exports. Longer term, as in the recent past, grain exports can boost U.S. prices, farm income, and phosphate fertilizer sales. In fact, the U.S. market for fertilizer won't grow much without exports.

Forecasting export markets is hazardous. The latest proof is the fate of U.S. plant expansions in acids and phosphates during the export boom from 1979 to early 1981. The ensuing export slump has delayed full use of large new capacity and stalled the next round of expansions.

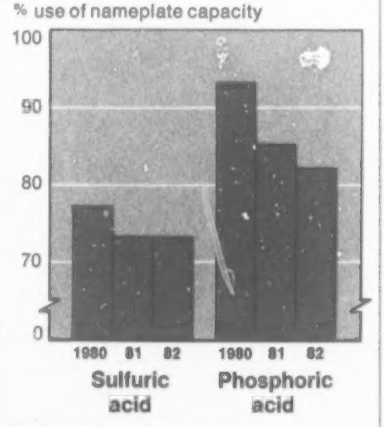
So for some time, perhaps two years, sulfuric and phosphoric acids may languish in a holding pattern. Production volume, 56 million to 57 million tons per year of 100% H_2SO_4 and H_3PO_4, will remain below combined production of 58.5 million tons in 1980. Estimated 1982 production value will be about $7 billion, up very little from 1980 and well down in constant dollars.

This inability to increase product prices with inflation will continue to plague acid producers. The resulting profits drain will help delay all expansion programs. Based on historic plant operating levels for phosphoric acid, which can be very high, current capacity will be enough to meet demand possibly to 1985.

However, forecasts for fertilizer demand are notorious for missing the mark. A sudden surge in demand throughout the world could bring shortages, even with new plant capacity coming outside the U.S. For the moment, U.S. acid producers can hope for the unexpected but cannot count on it.

Bruce Greek, Houston, and William Fallwell, Washington

Plant use is slipping for both big acids



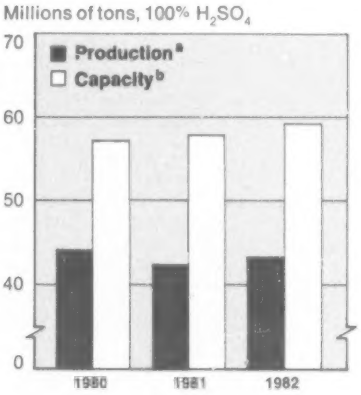
Sources: Industry, C&EN estimates, Commerce Department

Sulfuric Acid

H_2SO_4

- ***Demand repressed***
- ***Capacity rising***
- ***Prices poor***

PRODUCTION/CAPACITY



a From all sources. b First quarter.

HOW MADE

Sulfur dioxide from sulfur or smelter gases oxidized and reacted with water

MAJOR END USES (U.S.)

Fertilizer 70%; chemical manufacture, metal recovery, and petroleum refining, each 5%

FOREIGN TRADE

Exports—rising to more than 200,000 tons in 1982, imports—holding between 300,000 and 400,000 tons in 1982, mainly from Canada

PRICES

Posted contracts, nonsmelter acid, $75 to $95 per ton (merchant sales less than 30% of production)

COMMERCIAL VALUE

$3.25 billion for production, 1982

For sulfuric acid, the king of U.S. chemicals, trends are a bit elephantine—weighty and slow. But they are still an important matter for dozens of producers of this $3.25 billion-per-year product.

At the moment, sulfuric acid's steady expansion of recent years has slowed down because of trouble in its dominant market, phosphate fertilizer. Sulfuric is feeling some of the same price and profits pinch that has hit downstream.

Producers saw their hopes for a slight improvement in demand in 1981 dashed in the second half of the year. Now they are hoping for improvement again beginning in the second quarter of 1982. But there is no actual relief in sight.

Instead of a potential production increase of 1.5% in 1981, output apparently dropped 4 to 5%, or about 2 million tons (as 100% H_2SO_4) to about 42.5 million tons. Of course, that still leaves sulfuric well ahead of all other U.S. chemicals in volume.

In 1982, producers hope to compensate for a slow first quarter with a spurt in production in the second quarter and a high enough second half to hold on to the gain. If such a forecast proves accurate, production might rise a million tons in 1982 to around 43.5 million tons. Even so, output still would be below the 44.5 million tons in 1980, the last of the big fertilizer demand years.

Given two years of fairly flat volume, sulfuric has no problem in sufficient plant capacity and probably won't for several years. Current nameplate capacity is close to 60 million tons a year. It didn't exceed this figure in 1981 as expected because construction was delayed wherever possible, just as with capacity expansions in derivative phosphoric acid. Aside from such concurrent expansion with phosphoric acid, no other new sulfuric acid capacity is planned.

By-product sulfuric acid capacity from copper and other smelters also will expand little this year or next. Enough smelter acid capacity appears to be available to meet minuscule new industrial needs and possible demand increases in ore processing such as uranium.

The other main variable in sulfuric supply and demand, foreign trade, is small and quite volatile. Trade depends on nonchemical demand factors such as labor disruptions in the U.S. and Canadian smelting industries. Smelter shutdowns during strikes can draw in some foreign acid to both countries.

Behind the delay in new sulfuric acid capacity and the large overcapacity in sulfuric plants not connected to phosphoric acid are technical and regulatory forces as well as the poor market. Sulfuric plants, in contrast to phosphoric units, deteriorate rapidly if shut down. Hence, sulfuric plants still run at low levels even in times of scant demand. This pushes up production artificially. Then too, some sulfuric units at smelters must be oversized for a margin of safety to absorb all possible sulfur dioxide from the furnaces to prevent air pollution. These large sulfuric units can bloat sulfuric supply.

Sulfuric's odd capacity mix can cause a variety of strange market situations. Some can depress prices and profits.

The biggest problem occurs when phosphoric acid demand falls off and related high-priced sulfuric acid is offered to outside customers whose supply of low-priced smelter acid is disrupted. These customers, accustomed to cheap raw material, can bargain hard.

This is precisely what has happened in the second half of 1981 and so far in 1982 as derivative fertilizer production holds at a relatively low level. The diversion of acid to new customers has occurred even though sulfuric producers have throttled back their plants as much as they can, reduced inventories of acid and raw material sulfur, and minimized other operating costs.

The reduction in sulfuric operations has led to a small recovery in sulfur producers' own stocks after a long drawdown which boosted sulfur prices. As yet, sulfur prices have not come down. The probable reason is that competing production of sulfur in oil refining and natural gas processing has declined because of weak fuel markets. So the sulfur supply is not glutted.

Because more than 70% of sulfuric acid goes into fertilizer, the current slack in the fertilizer business has to hurt sulfuric. It will take an upturn in fertilizer to pull up sulfuric in 1982, and farmers in the U.S. and abroad are in no hurry yet for more supply.

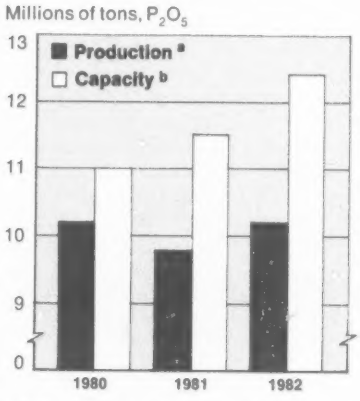
Key Chemicals

H_3PO_4

Phosphoric Acid

- ***Demand curbed***
- ***Capacity rise slowed***
- ***Prices shaved***

PRODUCTION/CAPACITY



a Both wet-process and furnace acid.
b First quarter.

HOW MADE

Reaction of phosphate rock with sulfuric acid; burning of elemental phosphorus and subsequent reaction with water

MAJOR DERIVATIVES

Ammonium phosphates 60%, triple superphosphate 20%

MAJOR END USES (U.S.)

Fertilizer 85%, detergent materials 5%, animal feed 5%

FOREIGN TRADE

Exports—may exceed 1 million tons as P_2O_5 in acid, imports—small, may reach 100,000 tons

PRICES

$300 to $425 per ton of P_2O_5 for fertilizer

COMMERCIAL VALUE

$4 billion for production, 1982

The rip-roaring U.S. phosphoric acid business of the past several years has sputtered into the same doldrums as its dominant market, phosphate fertilizer. Phosphoric's exalted plant-use rates, prices, and profits all have come down to earth. There they will lie until farmers here and abroad pick them up again.

Since U.S. farmers are getting poorer by the month as crops set new records and prices tumble, exports are the leading hope for phosphoric acid. But phosphoric exports are flat or falling even though Occidental Petroleum's big shipments to the Soviet Union are going full blast.

U.S. phosphoric acid producers still see 1982 as a year of potential recovery. They hope to match 1980 production, following an unexpected decline of 4% in 1981 production to 9.8 million tons. But they will have 13% more plant capacity to use. This suggests that prices will be under more downward pressure during the year.

For 1982, the breakdown of phosphoric acid production, in terms of P_2O_5 (to accommodate the different acid concentrations and derivatives made without isolating the acid) could be about 9.5 million tons of "wet-process" acid and 700,000 tons of "furnace" acid. Just about all of the wet acid, produced from sulfuric acid and phosphate rock, will go into fertilizer or animal feed. Furnace acid, produced mainly from elemental phosphorus in electric furnances, will go largely into detergents, food and beverages, dentifrices, and certain metal treatments.

Plant capacity for phosphoric acid is growing only in the wet-process area. Wet acid capacity will total nearly 11.4 million tons per year this quarter if some new units are completed. About 1 million tons of capacity exists for furnace acid, a figure that has been level or slightly down in recent years.

Further capacity additions in 1982 for wet acid are expected to be small, if anything. Earlier planned expansions are being delayed if at all possible because of the overcapacity situation.

The relatively large capacity for phosphoric acid guarantees a sharp drop in capacity use from super-tight 1980. That year, wet-process phosphoric plants ran at an estimated average rate of 95% of nameplate capacity. Although capacity for phosphoric acid is one of the most difficult in the chemical industry to pin down, most analysts agree that operations in 1979 and 1980 were so good that companies rushed into a round of plant additions. This expansion raised capacity almost 1 million tons in 1981.

Unfortunately, the immediate result was plant shutdowns. Industry analysts estimate that capacity shut down in 1981 was greater than the plant additions for varying periods. Shutdowns included some of the new capacity, which was run just long enough to check the work of construction contractors. Therefore, if 1981 production of wet-process acid totaled 9.1 million tons, the apparent average operating rate then fell to 87% of the 10.5 million tons of capacity available as the year opened. Capacity use then slipped during the year as additions were completed and now stands at about 82%.

This average doesn't look good for plants that can operate for extended periods at 110% of official capacity. But the picture isn't quite that bad. If 500,000 tons of the new 1981 capacity were available for operation, total capacity for 1981 would have been about 11 million tons. If 1 million tons were shut down for the year, then the operating rate for the rest would have been nearly 100%, just what the industry likes.

Currently, even more capacity may be down, perhaps 1.5 million tons. Phosphoric acid producers expect a slow first quarter because fertilizer dealers buying phosphoric derivatives know that farmers are in poor financial shape. Grain prices are down as farmers sell their inventories to meet debts and current cash needs.

Production of phosphoric acid likely will pick up during the second quarter, producers forecast, and hold up better than in 1981 as export sales improve for derivatives and for the acid itself. This consensus assumes that no U.S. government embargo appears on sales to the Soviets and that weather worldwide doesn't hamper agriculture to any significant extent.

But such improvement likely will not help phosphoric very much, and total value in 1982 may be no more than in 1981.

Europe's slump to continue in first-half 1982

West European chemical executives aren't sorry to see 1981 behind them. Admittedly, some sectors of the industry fared better than in 1980, but that's cold comfort considering that 1980 was generally a poor year.

For 1982, the expectation ("hope" probably is a more apt word) is that there will be a quickening in the pace of overall economic activity that will serve to pull chemicals' growth along with it. The general consensus, however, is that the first half of the year will remain fairly flat, and that any pickup won't make itself felt until the second half.

According to a position paper issued a few weeks ago by the European Council of Chemical Manufacturers' Federations (CEFIC), "The West European chemical industry will have to work out a new growth strategy. This will be focused on three main aspects—raw materials supply, efficiency of processes, and development of high-technology-intensive products."

Western Europe isn't an economic "whole" in the same sense that Canada, for example, or the U.S. are. Development of the chemical industry in individual European countries, therefore, will be affected largely by a variety of influences specific to each country. The French nationalization program, for instance, which embraces the most important segments of the country's chemical industry, probably will come to final fruition this year. But its implementation will be delayed somewhat by a recent ruling of France's highest judicial body that several provisions of the nationalization law, approved by the country's National Assembly last month, are unconstitutional.

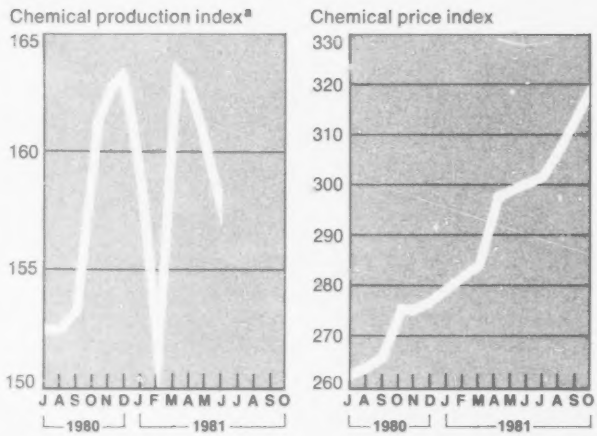
West Germany remains concerned about the continuing high cost of energy and raw materials, mainly owing to the fall in value of the Deutsche mark against the U.S. dollar. Karl Wamsler, in his outgoing speech as president of the Chemical Industries Association there, foresees that chemical companies' earnings in West Germany will be hurt again this year by rising costs and a weak economy as they were last year.

Although 1981 admittedly is history, statistical information still is coming in. France is the furthest behind in chemical production index data, with values currently available through last June. At 157 (1970 = 100), the index almost was unchanged from the January reading of 158. If the 1980 pattern of events is repeated, production last July and August will have slipped lower, with the probability of a slight upturn appearing in September, further strengthening in October. The average monthly reading for the first half of 1981 was 3.7% lower than the like 1980 level.

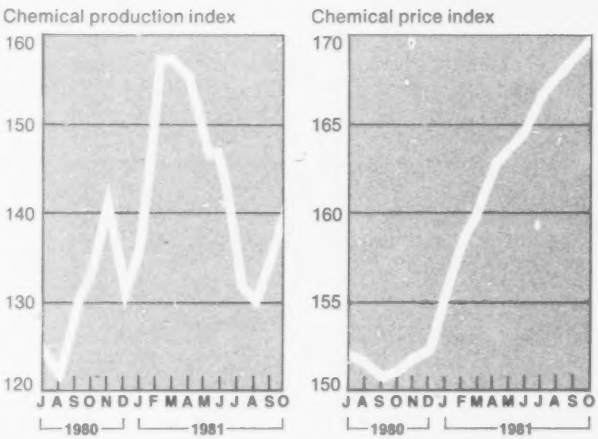
For both West Germany and the U.K., production index data are available through last October. In West Germany's case, the average monthly reading stood at 144.2 (1970 = 100), 1.8% ahead of that between January and October 1980. The U.K. didn't fare as well. Although the October 1981 reading of 131.1 (1970 = 100) was almost 9% up from the previous January's, the average during the year's first 10 months was almost 1% below the average for January through October 1980.

Dermot O'Sullivan, London

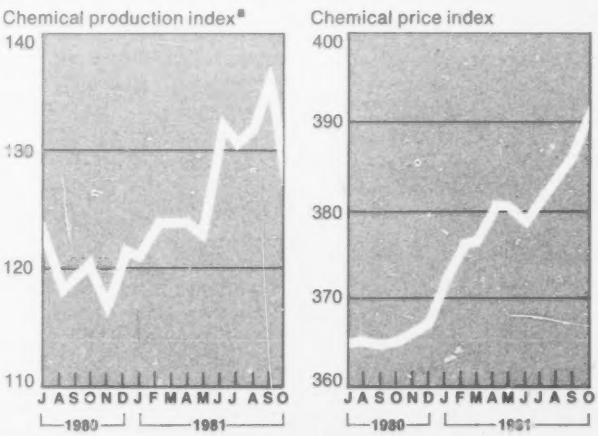
France



West Germany



U.K.



a Seasonally adjusted. **Note:** Base year for all indexes is 1970 = 100.